

SECTION I.—AEROLOGY.

SOLAR AND SKY RADIATION MEASUREMENTS DURING
AUGUST, 1918.

By HERBERT H. KIMBALL, Professor of Meteorology.

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For a description of instrumental exposures, and an account of the methods of obtaining and reducing the measurements, the reader is referred to the REVIEW for January, 1918, 46:2.

The monthly means and departures from normal values given in Table 1 show that direct solar radiation averaged above normal at Washington, D. C., and Lincoln, Nebr., very close to normal at Santa Fe, N. Mex., and slightly below normal at Madison, Wis.

Morning measurements made at Madison after the 26th have not been included, as a defect in the pyrheliometer leads was discovered later that cast doubt upon the accuracy of the morning readings after that date. For the reason given in connection with the July report, less than the usual number of readings were obtained at Lincoln during the current month.

Table 3 shows only unimportant departures from the normal for the month at Madison, and deficiencies of about 3 per cent at Washington and Lincoln.

Skylight polarization measurements at Washington on four days give a mean of 57 per cent with a maximum of 62 per cent on the 23d. Measurements at Madison on eight days give a mean of 62 per cent with a maximum of 71 per cent on the 31st. These readings are slightly above the average for the respective stations.

TABLE 1.—Solar radiation intensities during August, 1918.

[Gram-calories per minute per square centimeter of normal surface.]

Washington, D. C.

| Date. | Sun's zenith distance. | | | | | | | | | |
|-------------------------------------|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|-------|
| | 0.0° | 48.3° | 60.0° | 66.5° | 70.7° | 73.6° | 75.7° | 77.4° | 78.7° | 79.8° |
| | Air mass. | | | | | | | | | |
| | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| A. M. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. |
| Aug. 12..... | 1.21 | 1.25 | 1.00 | 0.80 | 0.70 | 0.61 | 0.54 | 0.50 | 0.45 | ..... |
| 14..... | 1.25 | 1.11 | 1.00 | 0.90 | 0.89 | 0.80 | ..... | ..... | ..... | ..... |
| 15..... | 1.25 | 1.11 | 1.00 | 0.90 | 0.89 | 0.80 | ..... | ..... | ..... | ..... |
| 16..... | 1.25 | 1.13 | 1.00 | 0.89 | 0.80 | ..... | ..... | ..... | ..... | ..... |
| 21..... | 1.46 | 1.35 | 1.25 | 1.16 | 1.08 | ..... | ..... | ..... | ..... | ..... |
| 23..... | 1.05 | ..... | 0.74 | 0.67 | 0.61 | ..... | ..... | ..... | ..... | ..... |
| Monthly means..... | 1.24 | 1.15 | 0.96 | 0.86 | 0.78 | (0.54) | (0.50) | (0.45) | ..... | ..... |
| Departure from 10-year normal..... | +0.00 | +0.08 | +0.06 | +0.04 | +0.04 | -0.10 | -0.04 | -0.08 | ..... | ..... |
| P. M. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Aug. 15..... | ..... | 1.19 | 1.10 | 1.02 | 0.94 | 0.87 | 0.80 | 0.74 | 0.68 | ..... |
| 21..... | ..... | ..... | 1.23 | 1.12 | 1.03 | ..... | ..... | ..... | ..... | ..... |
| Monthly means..... | ..... | (1.19) | (1.16) | (1.07) | (0.96) | (0.87) | (0.80) | (0.74) | (0.68) | ..... |
| Departures from 10-year normal..... | ..... | +0.10 | +0.19 | +0.22 | +0.21 | +0.21 | +0.21 | +0.21 | +0.14 | ..... |

TABLE 1.—Solar radiation intensities during August, 1918—Contd.
Madison, Wis.

| Date. | Sun's zenith distance. | | | | | | | | | |
|-----------------------------------|------------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| | 0.0° | 48.3° | 60.0° | 66.5° | 70.7° | 73.6° | 75.7° | 77.4° | 78.7° | 79.8° |
| | Air mass. | | | | | | | | | |
| | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| A. M. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. |
| Aug. 6..... | 1.12 | 1.05 | 0.92 | 0.85 | 0.77 | 0.70 | 0.63 | 0.57 | ..... | ..... |
| 13..... | 1.16 | 1.05 | 0.94 | 0.85 | 0.77 | 0.68 | 0.62 | 0.56 | ..... | ..... |
| 19..... | 1.39 | 1.27 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 24..... | 1.39 | 1.29 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 25..... | ..... | ..... | ..... | ..... | 0.95 | ..... | 0.82 | ..... | ..... | ..... |
| 26..... | 1.45 | ..... | ..... | ..... | ..... | 0.89 | 0.83 | 0.77 | ..... | ..... |
| Monthly means..... | 1.30 | 1.16 | (0.93) | (0.85) | 0.83 | 0.76 | 0.73 | 0.63 | ..... | ..... |
| Departure from 8-year normal..... | -0.01 | -0.02 | -0.15 | -0.15 | -0.08 | -0.12 | -0.08 | -0.15 | ..... | ..... |
| P. M. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Aug. 22..... | ..... | 1.05 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 26..... | ..... | 1.30 | 1.16 | 1.08 | 1.01 | 0.94 | 0.87 | 0.82 | 0.77 | 0.73 |
| Monthly means..... | ..... | (1.18) | (1.16) | (1.08) | (1.01) | (0.94) | (0.87) | (0.82) | (0.77) | (0.73) |
| Departure from 8-year normal..... | ..... | +0.03 | +0.14 | +0.13 | +0.16 | +0.14 | +0.07 | +0.06 | +0.16 | +0.03 |

Lincoln, Nebr.

| Date. | Sun's zenith distance. | | | | | | | | | |
|-----------------------------------|------------------------|--------|-------|--------|--------|--------|--------|--------|-------|-------|
| | 0.0° | 48.3° | 60.0° | 66.5° | 70.7° | 73.6° | 75.7° | 77.4° | 78.7° | 79.8° |
| | Air mass. | | | | | | | | | |
| | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| A. M. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. |
| Aug. 13..... | ..... | 1.20 | 1.09 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 26..... | 1.47 | ..... | 1.04 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 29..... | ..... | 1.15 | 1.04 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 31..... | 1.40 | 1.28 | 1.17 | 1.08 | 1.00 | 0.93 | 0.86 | 0.79 | ..... | ..... |
| Monthly means..... | (1.44) | 1.21 | 1.10 | (1.08) | (1.00) | (0.93) | (0.86) | (0.79) | ..... | ..... |
| Departure from 4-year normal..... | +0.10 | +0.02 | +0.02 | +0.09 | +0.10 | +0.07 | +0.05 | +0.05 | ..... | ..... |
| P. M. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Aug. 12..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 0.67 | 0.61 | 0.56 |
| 26..... | ..... | 1.37 | 1.27 | 1.17 | 1.08 | 1.02 | 0.96 | 0.90 | 0.85 | 0.80 |
| 29..... | ..... | 1.00 | 0.89 | ..... | 0.88 | 0.59 | 0.51 | 0.44 | 0.40 | 0.37 |
| 31..... | ..... | ..... | 1.19 | 1.10 | 1.00 | ..... | ..... | ..... | ..... | ..... |
| Monthly means..... | ..... | (1.18) | 1.12 | (1.14) | 0.92 | (0.80) | (0.74) | 0.67 | 0.62 | 0.58 |
| Departure from 4-year normal..... | ..... | -0.02 | +0.02 | +0.12 | ±0.00 | -0.05 | -0.03 | -0.07 | -0.10 | -0.11 |

Santa Fe, N. Mex.

| Date. | Sun's zenith distance. | | | | | | | | | |
|------------------------------------|------------------------|--------|--------|--------|--------|--------|--------|--------|-------|-------|
| | 0.0° | 48.3° | 60.0° | 66.5° | 70.7° | 73.6° | 75.7° | 77.4° | 78.7° | 79.8° |
| | Air mass. | | | | | | | | | |
| | 1.0 | 1.5 | 2.0 | 2.5 | 3.0 | 3.5 | 4.0 | 4.5 | 5.0 | 5.5 |
| A. M. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. | cal. |
| Aug. 1..... | 1.39 | 1.29 | 1.21 | 1.13 | 1.05 | 0.98 | 0.92 | 0.87 | 0.84 | ..... |
| 2..... | ..... | ..... | ..... | 1.03 | 0.94 | ..... | ..... | ..... | ..... | ..... |
| 3..... | 1.38 | 1.26 | 1.16 | 1.07 | 0.99 | ..... | 0.88 | ..... | ..... | ..... |
| 5..... | ..... | ..... | 1.19 | 1.13 | ..... | ..... | ..... | ..... | ..... | ..... |
| 9..... | ..... | ..... | ..... | 1.06 | 1.02 | 0.94 | 0.86 | ..... | ..... | ..... |
| 10..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | 0.82 | ..... | ..... |
| 13..... | ..... | 1.28 | 1.23 | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 15..... | 1.39 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 17..... | ..... | 1.34 | 1.19 | ..... | ..... | 0.99 | 0.92 | 0.87 | 0.81 | ..... |
| 23..... | ..... | 1.38 | 1.25 | 1.19 | 1.10 | 1.02 | 0.94 | ..... | ..... | ..... |
| 26..... | ..... | 1.35 | 1.26 | ..... | ..... | ..... | 0.97 | ..... | ..... | ..... |
| 27..... | ..... | 1.27 | 1.27 | 1.17 | 1.11 | 1.05 | 1.00 | 0.95 | 0.90 | ..... |
| 29..... | 1.42 | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| 30..... | ..... | ..... | 1.09 | 1.02 | 0.92 | 0.84 | ..... | ..... | ..... | ..... |
| Monthly means..... | 1.40 | 1.31 | 1.21 | 1.10 | 1.02 | 0.97 | 0.93 | 0.88 | 0.85 | ..... |
| Departures from 6-year normal..... | -0.02 | -0.01 | -0.01 | -0.04 | -0.05 | -0.04 | -0.02 | -0.04 | -0.07 | ..... |
| P. M. | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... | ..... |
| Aug. 19..... | ..... | 1.40 | ..... | ..... | ..... | 1.09 | ..... | ..... | ..... | ..... |
| 23..... | ..... | 1.45 | 1.32 | 1.24 | 1.16 | 1.10 | 1.04 | 0.99 | ..... | ..... |
| Monthly means..... | ..... | (1.42) | (1.32) | (1.24) | (1.16) | (1.10) | (1.04) | (0.99) | ..... | ..... |

TABLE 2.—Vapor pressures at pyrheliometric stations on days when solar radiation intensities were measured.

| Washington, D. C. | | | Madison, Wis. | | | Lincoln, Nebr. | | | Santa Fe, N. Mex. | | |
|-------------------|-------|-------|---------------|-------|-------|----------------|-------|-------|-------------------|-------|-------|
| Dates. | a. m. | p. m. | Dates. | a. m. | p. m. | Dates. | a. m. | p. m. | Dates. | a. m. | p. m. |
| 1918. | mm. | mm. | 1918. | mm. | mm. | 1918. | mm. | mm. | 1918. | mm. | mm. |
| Aug. 12 | 19.89 | 21.28 | Aug. 6 | 14.10 | 15.11 | Aug. 12 | 13.13 | 23.52 | Aug. 1 | 7.87 | 9.83 |
| 14 | 19.23 | 19.89 | 13 | 16.20 | 16.79 | 13 | 17.37 | 15.11 | 2 | 7.87 | 7.87 |
| 15 | 12.68 | 12.68 | 19 | 11.38 | 10.59 | 26 | 11.38 | 7.29 | 3 | 7.29 | 6.27 |
| 16 | 13.13 | 15.11 | 22 | 17.96 | 19.23 | 29 | 8.48 | 14.10 | 5 | 6.27 | 7.29 |
| 21 | 11.38 | 13.61 | 24 | 15.11 | 12.24 | 31 | 7.04 | 7.57 | 9 | 10.59 | 7.87 |
| 23 | 14.60 | 16.20 | 25 | 13.13 | 13.13 | | | | 10 | 7.87 | 10.59 |
| | | | 26 | 13.13 | 9.83 | | | | 13 | 8.48 | 10.59 |
| | | | | | | | | | 15 | 7.87 | 7.87 |
| | | | | | | | | | 17 | 9.83 | 7.29 |
| | | | | | | | | | 19 | 5.79 | 6.76 |
| | | | | | | | | | 23 | 9.14 | 4.75 |
| | | | | | | | | | 26 | 7.29 | 9.83 |
| | | | | | | | | | 27 | 6.02 | 6.02 |
| | | | | | | | | | 29 | 7.29 | 10.59 |
| | | | | | | | | | 30 | 7.87 | 8.48 |

TABLE 3.—Daily totals and departures of solar and sky radiation during August, 1918.

[Gram-calories per square centimeter of horizontal surface.]

| Day of month. | Daily totals. | | | Departures from normal. | | | Excess or deficiency since first of month. | | |
|--|---------------|----------|----------|-------------------------|-----------|----------|--|-----------|----------|
| | Washington. | Madison. | Lincoln. | Washington. | Madison. | Lincoln. | Washington. | Madison. | Lincoln. |
| Aug. 1. | cal. 480 | cal. 425 | cal. 651 | cal. - 3 | cal. - 50 | cal. 115 | cal. - 3 | cal. - 50 | cal. 115 |
| 2. | 467 | 545 | 627 | - 15 | 72 | 94 | - 18 | 22 | 209 |
| 3. | 477 | 573 | 627 | - 4 | 102 | 96 | - 22 | 124 | 305 |
| 4. | 314 | 286 | 663 | -166 | -183 | 135 | -188 | - 59 | 440 |
| 5. | 542 | 495 | 614 | 63 | 28 | 38 | -125 | - 31 | 528 |
| 6. | 533 | 588 | 571 | 56 | 124 | 48 | - 69 | 93 | 576 |
| 7. | 476 | 489 | 215 | 2 | 27 | -304 | - 67 | 120 | 272 |
| 8. | 536 | 375 | 294 | 65 | - 84 | -222 | - 2 | 36 | 50 |
| 9. | 463 | 538 | 306 | - 5 | 81 | -206 | - 7 | 117 | -156 |
| 10. | 296 | 475 | 574 | -169 | 21 | 65 | -176 | 138 | - 91 |
| 11. | 388 | 258 | 415 | - 79 | -193 | - 90 | -255 | - 55 | -181 |
| 12. | 508 | 552 | 613 | 44 | 104 | 111 | -211 | 49 | - 70 |
| 13. | 440 | 509 | 481 | - 16 | 64 | - 67 | -227 | 113 | -137 |
| 14. | 508 | 573 | 287 | 50 | 180 | -208 | -177 | 243 | -345 |
| 15. | 609 | 411 | 447 | 159 | - 29 | - 44 | - 18 | 214 | -389 |
| 16. | 575 | 77 | 521 | 128 | -361 | 33 | -110 | -147 | -356 |
| 17. | 126 | 121 | 315 | -318 | -314 | -169 | -208 | -401 | -525 |
| 18. | 84 | 499 | 520 | -856 | 67 | 39 | -564 | -394 | -486 |
| 19. | 525 | 593 | 525 | 88 | 163 | 57 | -476 | -231 | -429 |
| 20. | 543 | 429 | 360 | 109 | 2 | -115 | -367 | -229 | -544 |
| Decade departure | | | | | | | - 191 | -367 | -453 |
| 21. | 593 | 365 | 590 | 162 | - 60 | 118 | -205 | -289 | -426 |
| 22. | 437 | 552 | 405 | 9 | 110 | - 64 | -196 | -179 | -490 |
| 23. | 500 | 243 | 389 | 75 | -177 | - 77 | -121 | -356 | -567 |
| 24. | 574 | 558 | 564 | 152 | 141 | 101 | 31 | -215 | -406 |
| 25. | 500 | 504 | 474 | 80 | 90 | 14 | -11 | -125 | -452 |
| 26. | 400 | 565 | 599 | - 18 | 154 | 131 | 93 | 29 | -321 |
| 27. | 412 | 478 | 521 | - 4 | 70 | 68 | 80 | 99 | -255 |
| 28. | 89 | 283 | 358 | -325 | -122 | - 95 | -236 | - 23 | -350 |
| 29. | 372 | 527 | 542 | - 40 | 125 | 92 | -276 | 102 | -258 |
| 30. | 422 | 297 | 142 | 12 | -102 | -306 | -264 | 0 | -564 |
| 31. | 338 | 543 | 614 | - 70 | 152 | 168 | -334 | 152 | -396 |
| Decade departure | | | | | | | + 33 | +381 | +148 |
| Excess or deficiency since first of year | Gr.-cal. | | | | | | | | |
| | Per cent. | | | | | | | | |
| | | | | | | | -1,266 | +938 | +276 |
| | | | | | | | 1.3 | +1.0 | +0.2 |